

II. REMARKS

The Examiner requires restriction of the present application to one of the following inventions:

Group I: Claims 1-5 and 10-15, drawn to a device for supplying gas; and

Group II: Claims 6-9 and 16-18, drawn to a method for supplying gas.

The Examiner contends that Group I and Group II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the inventions lack the same or corresponding special technical features because the technical features shared by Groups I and II are allegedly obvious over Wilmer (U.S. Patent 5,865,205) in view of Matsuse et al. (U.S. Patent 5,951,772).

More specifically, the Examiner contends that Wilmer discloses a device for supplying gas that has all the claimed limitations of the present application except for the shower plates that are fixed to the ends of the first and second branch supply lines (Office Action, dated April 7, 2011, at 2, line 11, to 3, line 15). The Examiner argues Matsuse et al., however, discloses a device for supplying gas and further teaches shower plates that are fixed to the ends of the gas supply lines (Office Action, dated April 7, 2011, at 3, lines 15-17). The Examiner thus contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device disclosed by Wilmer so that it employs the shower plate structure disclosed by Matsuse et al. in order to provide an even distribution of the gas in the processing chamber.

The Examiner's contentions are incorrect because the claimed invention pertains to a device for supplying gas that has a notably different configuration from the device disclosed by either Wilmer or Matsuse et al. In particular, neither Wilmer nor Matsuse et al. teaches or

suggests a gas supplying device with special technical features that include dividing gas “at a specified flow rate ratio Q_1/Q_2 ,” “wherein Q_1 and Q_2 are specified quantities of gas supplied to the first branch supply line and the second branch supply line, respectively,” and “a pressure type division quantity controller connected to the first bypass line and the second bypass line.” These patentable special technical features are recited in both claims 1 and 6, the independent device and method claims in the above-captioned application.

Applicants elect Group I, claims 1-5 and 10-15, for further prosecution on the merits.
Claims 1-5 and 10-15 all encompass the elected invention.

However applicants’ election is made with traverse because the combination of Wilmer and Matsuse et al. does not render obvious the claims or the common technical features of the device and method claims. There are numerous patentable, special technical features, common to both the device and method claims. As discussed further below, one such important common special technical feature is that “a pressure type division quantity controller is connected to the first bypass line and the second bypass line.”

A. The Law of Obviousness

A prima facie case of obviousness requires a showing that the scope and content of the prior art teaches each and every element of the claimed invention, and that the prior art provides some teaching, suggestion or motivation, or other legitimate reason, for combining the references in the manner claimed. KSR International Co. v. Teleflex Inc., 127 S.Ct. 1727, 1739-41 (2007); In re Oetiker, 24 U.S.P.Q.2d 1443 (Fed. Cir. 1992). In this case, the Examiner has failed to establish a prima facie case of obviousness against the present claims because the combination of Wilmer and Matsuse et al. fails to teach, or suggest, each and every limitation recited in these claims.

B. The Invention

The claimed invention relate generally to a device and a method for controlling gas flow while the gas is supplied to a chamber. More specifically, independent claim 1 recites a device for supplying a specified quantity of gas, while “dividing at a specified flow rate ratio $Q1/Q2$ from a gas supply facility,” “wherein $Q1$ and $Q2$ are specified quantities of gas supplied to the first branch supply line and the second branch supply line, respectively,” and “a pressure type division quantity controller is connected to the first bypass line and the second bypass line.” These features are also recited in and common to independent method claim 6.

In accordance with an embodiment of the claimed invention, a device and a method for supplying gas while dividing the gas to a chamber are provided that include the features recited by claims 1 and 6, respectively. Various other embodiments, in accordance with the claimed invention, are recited in the dependent claims.

An object of various embodiments of the claimed invention is to improve flow rate control accuracy and efficiency, and simplify the structure of the device and thus decrease cost. An advantage of various embodiments in accordance with the claimed invention is that an accurate pressure control at different flow rate ratios can be achieved efficiently at a low cost with a division quantity controller that includes only a single pressure type division quantity controller (FV as shown in Fig. 1 in the above-captioned application) connected to the two branch supply lines (GL_1 and GL_2) via a first bypass line BL_1 and a second bypass line BL_2 .

C. Wilmer

Wilmer discloses a method and an apparatus for controlling delivery of gas from a reservoir to a process chamber. According to Wilmer, the flow of gas from the reservoir to

the process chamber is metered by a variable flow valve under the control of a flow control circuit and a calibration circuit. (See Abstract of Wilmer).

Wilmer discloses a gas delivery system where gas is delivered through a single gas flow controller and also teaches delivery of gas from a reservoir through a plurality of gas flow channels. (See column 9, lines 50-55 and Figure 4 of Wilmer). In addition, Wilmer discloses that in some circumstances, gas may be released into different channels through reservoir bypass valves without first passing through the reservoir. (See column 9, line 66, to column 10, line 3 of Wilmer). According to Wilmer, a gas flow may be delivered to one gas flow channel from reservoir while the same gas or another gas is delivered to the other gas flow channel through a reservoir bypass valve. (See column 12, lines 33 – 57 of Wilmer).

As admitted by the Examiner (Office Action, dated April 7, 2011, at 3, lines 13-17), Wilmer does not teach, or suggest, that there are shower plates fixed to the ends of the branch supply lines as recited in the claimed invention.

However, this is not the only deficiency in the disclosure of Wilmer. The object of Wilmer is to provide a gas supplying device that is capable of delivering a gas flow to a processing apparatus with a high degree of accuracy. (See column 2, lines 61-63 of Wilmer). As a result, Wilmer is not concerned with dividing and supplying gas from the same gas supply source to chambers with certain flow rates Q_1 and Q_2 and at a specified flow rate ratio Q_1/Q_2 . There is therefore no teaching or suggestion in Wilmer with respect to these technical features of the present claims.

As discussed above, a purpose of various embodiments of the claimed invention, however, is to simplify the structure of a gas supplying device so that gas can be supplied and divided accurately and quickly. With this purpose in mind, the claims require “a device for supplying a specified quantity of gas” that not only has “shower plates fixed to the end of the first branch supply line and the second branch supply line” but more notably “a pressure-type

division quantity controller that is connected to the first bypass line and the second bypass line” so that gas Q from the same gas supply source can be accurately divided and supplied to chambers with “specified quantities of gas supplied to the first branch supply line and the second branch supply line, respectively” and “at a specified flow rate ratio Q_1/Q_2 ”.

The Examiner states that valves 580a and 580b shown in Fig. 4 of Wilmer are seen as a pressure type division quantity controller because the opening and closing of these valves function to control the division of pressure in gas supply lines 570 and 572. (Office Action, dated April 7, 2011, at 3, lines 6-8).

Applicants respectfully disagree with the Examiner’s reading of Wilmer. First of all, the pressure type division quantity controller (FV) recited in the claimed invention is not a simple “reservoir bypass valve” like 580a or 580b disclosed in Wilmer. Instead, it comprises a control valve (CV) and a driving control part (CPU) for regulating the degree of opening of CV through the mediation of CPU with the control signal inputted through line EL₃ from the communication circuit (CT). (See [0036] and Fig. 2 of the above-captioned application). Second, both the first and the second branch supply lines share one single pressure type division quantity controller in the claimed invention so that information from the first and second branch lines can be both received by the controller FV and appropriate adjustment can be made accordingly. However, what Wilmer teaches is that there is a separate reservoir bypass valve in each gas supply line. As a result, there is no communication between the two gas supply lines in Wilmer. Thus, Wilmer teaches against the present combination. Therefore, the configuration of the device recited in the claimed invention is fundamentally different from that disclosed by Wilmer. In particular, Wilmer not only does not disclose shower plates but also fails to teach, or suggest, a pressure type division quantity controller disposed between the two bypass lines as presently claimed.

In summary, Wilmer fails to teach, or suggest, numerous features of the present claims, including the common special technical features shared by the device claims 1-5 and 10-15 and the method claims 6-9 and 16-18. Therefore, Wilmer cannot render obvious the subject matter of the present claims under PCT Rule 13.2.

D. Matsuse et al.

Matsuse et al. discloses a vacuum processing apparatus that includes a processing gas supply pipe for supplying gas from a processing gas supply source into a vacuum processing chamber and a pressure reducing valve for keeping the gas supply pipe at a lower pressure than the atmospheric pressure. (See Abstract of Matsuse et al.).

Matsuse et al. has the same deficiencies as Wilmer in that Matsuse et al. do not teach “a device for supplying a specified quantity of gas” that has “a pressure-type division quantity controller connected to the first bypass line and the second bypass line” so that gas Q from the same gas supply source can be accurately divided and supplied to chambers with “specified quantities of gas supplied to the first branch supply line and the second branch supply line, respectively” and “at a specified flow rate ratio Q_1/Q_2 ”. Therefore, Matsuse et al. cannot render obvious the subject matter of the present claims under PCT Rule 13.2, either.

In Matsuse et al., predetermined processing gas is supplied into the processing chamber through a gas dispersion/supply unit (shower header) attached to a gas supply pipe. (See column 6, lines 43-49 of Matsuse et al.). Each gas dispersion/supply unit has a disk-like hollow shape and has a large number of gas supply holes formed in its lower surface. (See column 6, lines 39-43 of Matsuse et al.).

The Examiner states that although Wilmer does not teach shower plates (see discussions above), it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings from Matsuse et al. and Wilmer for the

purpose of providing an even distribution of the gas in the process chamber. (Office Action, dated April 7, 2011, at 3, lines 13-20). Applicants respectfully disagree.

A proper obviousness rejection requires showing: (1) that a person of ordinary skill in the art would have had a legitimate reason to attempt to make the composition or device, or to carry out the claimed process, and (2) that the person of ordinary skill in the art would have had a reasonable expectation of success in doing so. PharmaStem Therapeutics, Inc. v. ViaCell, Inc., 491 F.3d 1342, 1360 (Fed. Cir. 2007).

In this case, the Examiner has not established a legitimate reason that a person of ordinary skill in the art would have attempted to make the claimed arrangement. The shower header disclosed in Matsuse et al. is for the purpose of an even distribution of the gas in the process chamber (see column 6, lines 50-59 of Matsuse et al.); on the other hand, the purpose of the shower plates employed in the claimed invention is to control the quantity of the gas (Q_1 and Q_2) supplied to each chamber (see [0037] of the above-captioned application). In other words, the purpose of attaching shower plates at the end of each branch supply line in the claimed invention is not the one alleged by the Examiner and is certainly distinctly different from the purpose expressed in Matsuse et al. Therefore, the Examiner has not established a legitimate reason to combine the teachings from Matsuse et al. with those from Wilmer, outside of applicants' own disclosure. For the same reasons, neither has the Examiner established that a person of ordinary skill in the art would have had a reasonable expectation of success of arriving at Applicants' claimed invention.

For all the above reasons, the Examiner has failed to establish a prima facie case of obviousness against device claims 1-5 and 10-15 over Wilmer in view of Matsuse et al.

Since the patentable special technical features recited in claims 1-5 and 10-15 are shared by method claims 6-9 and 16-18, the Examiner has also failed to establish a prima facie case of obviousness against claims 6-9 and 16-18.

III. CONCLUSION

For the reasons above, both the device claims 1-5 and 10-15 and the method claims 6-9 and 16-18 contain numerous patentable, special technical features. Therefore, the restriction requirement is improper under PCT Rules 13.1 and 13.2, and should be withdrawn.

The below-signed attorney for Applicants welcomes any questions.

Respectfully submitted,

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